CDHNF NASPGHAN
P.O. Box 6 or
1501 Bethlehem Pike
Flourtown, PA 19031

CDHNF NASPGHAN American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

# CASE THREE

## Diagnosis & Management

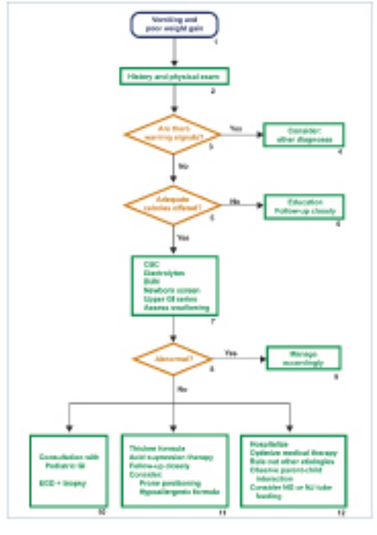
An apparent life threatening event, or ALTE, is a frightening episode in an infant that is characterized by some combination of apnea, color change, marked change in muscle tone, choking and/or gagging.

## Testing

There are several potential causes for an ALTE. These include: central apnea, obstructive apnea, gastroesophageal reflux, cardiac arrhythmia, viral infections and seizure disorders. The fact that this child was normal in appearance upon reaching the emergency room makes viral infections, metabolic disorders, central nervous system conditions, trauma or seizures less likely. Based on the history and physical examination the following laboratory tests should be considered:

1. ECG
2. EEG
3. Esophagram to evaluate for a tracheal-esophageal fistula
4. Modified barium swallow study to evaluate for aspiration
5. Infectious disease workup

If the esophageal pH monitoring suggests a temporal association between reflux and the ALTE, management options include: acid suppression therapy and thickening of feeds. In very severe cases where recurrent ALTE episodes occur, surgery may be considered.




## Lessons Offered

It is frequently difficult to decide whether there has been a true life-threatening event. In approximately 50% of cases of ALTE the cause is not found. Premature infants are at greater risk for an ALTE. The diagnosis of ALTE requires a complete history and physical examination. The prevalence of recurrent regurgitation in infants with ALTE is as high as 70%, and many infants with an ALTE will have an abnormal esophageal pH study. However, most studies in ALTE have not demonstrated a convincing relationship between reflux and the ALTE.

In a healthy appearing infant, such as the infant in this case, laboratory studies generally are within normal limits. However, if the infant appears ill appropriate laboratory studies should be performed.

Generally, if there is an association of ALTE with feeding, conservative treatment, which includes acid suppression, should be considered.

The North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN) represents more than 1000 pediatric gastroenterologists predominantly located in the United States, Canada and Mexico. NASPGHAN strives to improve the care of infants, children and adolescents with digestive disorders by promoting advances in clinical care, research and education.

The Children's Digestive Health and Nutrition Foundation (CDHNF) was established by NASPGHAN to promote research and education that will improve the health of children with digestive and nutritional disorders.

Pediatric Gastroesophageal Reflux Clinical Practice Guidelines were published in the Journal of Pediatric Gastroenterology and Nutrition 2001; Volume32: Supplement 2 pages 1-31. Complete guidelines can also be found on the following websites: **www.CDHNF.org** or **www.NASPGHAN.org.**

Educational support for the CDHNF Pediatric GERD Education Campaign was provided by major sponsor **TAP Pharmaceutical Products Inc.**

**Faculty**

Steven J. Czinn, MD
Chief, Division of Pediatric Gastroenterology
Rainbow Babies & Children's Hospital
Professor of Pediatrics and Pathology
Case Western Reserve University

Joseph Levy, MD
Professor of Clinical Pediatrics
Director, Children's Digestive Health Center
Children's Hospital of New York

Suzanne P. Nelson, MD, MPH
Children's Memorial Hospital
Assistant Professor of Pediatrics
Feinberg School of Medicine
Northwestern University

**Disclosures**

All faculty participating in continuing medical education programs sponsored by NASPGHAN are expected to disclose to the program audience any real or apparent conflict(s) of interest related to the content of their presentation. A listing of faculty disclosures for this activity includes:

Dr. Czinn reports that he has a financial interest or other relationship with TAP Pharmaceuticals in the role of a consultant.

Dr. Levy reports that he intends to discuss unlabeled/off-label use of a FDA-approved product in the presentation of his case study.

Dr. Nelson reports that she has a financial interest or other relationship with TAP pharmaceuticals as a consultant and member of their speakers bureau and receives research support from J and J Pharmaceuticals and serves as a consultant.

**Pediatric GERD Campaign**
Harland S. Winter, MD, Chair

**CDHNF President**
George D. Ferry, MD

# Evaluation and Treatment of **Infants** with **GER** and **GERD**

## About This Activity

This newsletter content was developed to assist the primary and specialist medical provider in the evaluation and management of gastroesophageal reflux in infants. Please read the publication, reflect on its content, complete the CME Self-Assessment and CME evaluation, and return them to the address indicated. Upon receipt, your certificate of completion will be sent to you along with the correct answers to the CME Self-Assessment. The estimated time a learner will need to complete this self-study activity is 1 hour.

## Learning Objectives

From a complete review of the case studies, participants should be better able to:

A. Understand the natural history of infant regurgitation

B. Recognize the presence or absence of "red-flag" symptoms that may indicate a diagnosis of gastroesophageal reflux disease (GERD) and the need for medical testing.

C. Understand several first-phase therapy strategies in order to alleviate symptoms of gastroesophageal reflux (GER) and gastroesophageal reflux disease (GERD).

D. Identify and recommend further medical tests which will be helpful with the GERD diagnosis.

## Accreditation

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint sponsorship of the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) and the Children's Digestive Health and Nutrition Foundation (CDHNF). NASPGHAN is accredited by the ACCME to provide continuing medical education for physicians and takes responsibility for the content, quality, and scientific integrity of this CME activity.

## CME

NASPGHAN designates this pediatric GERD newsletter for up to 1.0 hours in Category 1 credit towards the Physician's Recognition Award. Each physician should only claim those hours he/she spent in the educational activity.

CDHNF Children's Digestive Health and Nutrition Foundation

NASPGHAN North American Society for Pediatric Gastroenterology, Hepatology and Nutrition

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

www.CDHNF.org • www.NASPGHAN.org.

This publication was last updated on May 11, 2004.

## CASE STUDY 1

### Just A "Happy Spitter?"

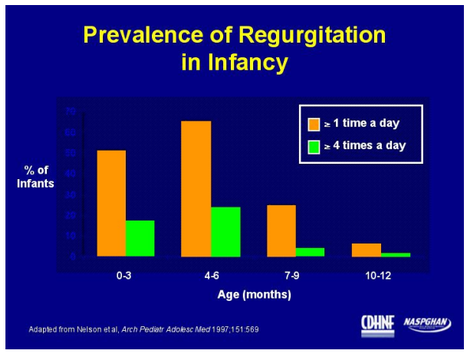
A three-month-old former full term infant is brought to your office because the parents are concerned that the child spits up multiple times a day. The child is growing well and the physical exam is entirely normal. Is testing or treatment necessary?

### Medical History

In order to give appropriate anticipatory guidance to parents, it is important to understand the natural history of GER in infants. Parents can be reassured that regurgitation is common during the first year of life. As shown in Figure 1, the frequency of regurgitation peaks at about 4 months of age with most infants outgrowing their regurgitation by 7 months of age and almost all by one year. So it is important to tell the parents of this infant that their child's regurgitation may get worse before it gets better.

### Diagnosis & Management

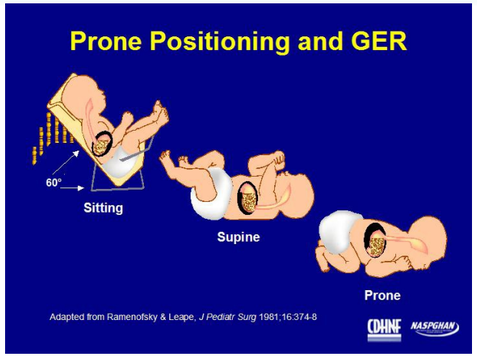
In order to make an accurate diagnosis and effectively treat this child, it is important to gather a more complete medical and feeding history. "Red flags" that this infant may have a more serious problem include poor growth, hematemesis, feeding problems, respiratory problems or excessive irritability.




Infants who are just "happy spitters" may benefit greatly from a few conservative management techniques including changes in positioning and feeding. These measures are not perfect and parents need to be counseled that the goal is improvement of, not elimination of, the problem.

### Positioning

Keeping infants who regurgitate upright at least thirty minutes after meals often helps along with elevating the head of the crib and diaper changing table to 30 degrees so they never lay flat. Prone positioning is also useful, but is not recommended during sleep because of the concern of sudden infant death syndrome. Placing the infant in a car seat in the home should be avoided.




Since increased gastric pressure can cause regurgitation, it is recommended to burp the infant as needed, keep the diapers loose and avoid tight elastic waistbands.

### Feeding

Most infants will regurgitate breast milk less than formula, so it is not recommended to stop breast-feeding in an infant with GER.

Thickening the formula will help decrease the amount of regurgitation and lessen irritability. It is recommended to start at one teaspoon of rice cereal per ounce and increase to one tablespoon per ounce as tolerated.

It is important that parents of infants with regurgitation are counseled to avoid over-feeding their child. Even though the child may seem to throw-up the entire bottle they should wait until the next feeding time to try again. Allowing the stomach to empty allows the next feeding to be better tolerated.

Some infants with regurgitation may have a milk and/or soy protein allergy. Therefore a two-week trial of a hypoallergenic diet can be tried.

### Testing

Infants with uncomplicated regurgitation do not require further testing. An upper GI series is not useful unless you are worried about obstruction, for example in an infant with so much regurgitation they are unable to gain weight or in an infant with bilious emesis.

### Lessons Offered

Not all vomiting is GERD and practitioners should take care to look for warning signs. However, infants with simple regurgitation can be managed effectively with parental reassurance, accurate anticipatory guidance and education about conservative measures.

Careful review of medical history along with regular check-ups should be used to distinguish the "happy spitter" from the infant with more serious disease. For more information about the management of an infant with GER visit **WWW.CDHNF.ORG** where complete algorithms for treatment, guidelines and symptom charts are available.

## CASE STUDY 2

### Recurrent Vomiting With Poor Weight Gain

A 10-month old , full-term infant well known to your practice has poor weight gain and recurrent vomiting. The infant was initially breast fed and then introduced to a cow's milk formula. Parents describe some irritability after feedings, but until last month, weight gain was consistent. Solid foods were introduced at 5 months of age, and have expanded to include all cereals, fruits, vegetables and chicken. Parents report more frequent vomiting in the past 6 weeks. The vomiting usually occurs after a meal, but may occur even 2 hours later. Vomiting is non-bilious and not projectile. Weight gain has slowed down, and she is only 5 oz heavier since her previous visit 2 months before.

### Medical History

Having familiarity of the patient and a more complete medical history makes the diagnosis of problematic symptoms easier. Though regurgitation is common during the first year of life, there are several "red flags" to investigate in this case.

1. The vomiting started after age 6 months
2. Irritability is present
3. Weight gain has begun to decline

One of the more important questions for the physician is how extensive should further investigation and testing be in order to evaluate GERD? With the resulting poor weight gain, other questions to ask in gathering a complete history should include:

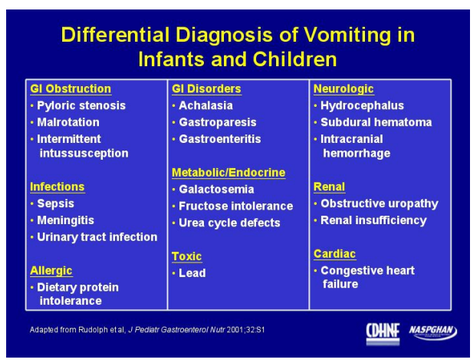
1. Are sufficient calories being consumed? Is formula preparation adequate?
2. Could the vomiting and failure to thrive reflect an underlying metabolic or genetic problem?
3. Is there any evidence of malabsorption?
4. Is the vomiting bilious? Does it have material suggestive of fresh blood or digested blood (coffee grounds)? Is it projectile? Is there abdominal distention or tenderness? Is there organomegaly?
5. Though slowing, is weight gain adequate?

### Diagnosis and Management

Further testing may diagnose other conditions responsible for the observed symptoms. The presence of excessive irritability can represent many systemic diseases. Metabolic inborn errors can result in feeding difficulties and food refusal. They can be associated with organomegaly and dysmorphic features. Irritability can also be a sign of esophagitis or gastritis, either peptic or allergic in nature. Urinary tract infections can present with vomiting and failure to thrive. Bilious vomiting can reflect an underlying anatomical abnormality such as malrotation, volvulus or annular pancreas. Hematemesis suggests esophageal or gastric ulceration. The physician should also be on the lookout for other neurological signs, such as neck posturing, opisthotonos, excessive head circumference growth, microcephaly, and the presence of seizures. Further testing in this case is needed.

### TESTING

In this case, the pediatrician should do the lab test indicated and a trial of acid suppression.




If this is not helpful, then referral to a pediatric gastroenterologist for further evaluation and management is indicated. An endoscopy is helpful to document the presence of mucosal inflammation or villus atrophy. Suggested laboratory testes may include:

- Complete blood count
- Electrolytes
- Liver profile
- Urine ketones and reducing substances
- Review of the newborn screening tests
- Stool guaiac
- Immunoglobulins
- Celiac disease profile (total IgA level and a TTG)
- Sweat test

### Feeding

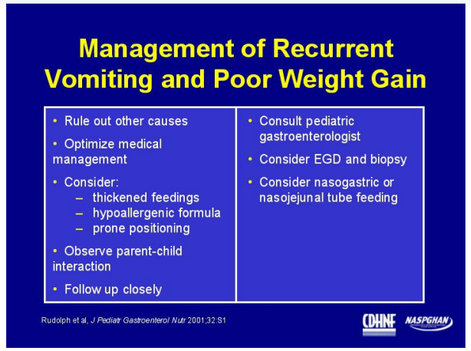
Once the adequacy of calories has been established and a consistent feeding pattern is determined, changes to the diet may be recommended to help isolate irritating substances.

Thickening the formula is recommended since it has been shown to help both irritability and weight gain. A trial of hypoallergenic formula may also be helpful while the work-up is pursued.

The vomiting and failure to thrive leave the impression that there remains a complicating, underlying factor, perhaps an allergic enteropathy or celiac disease.

### Lessons Offered

Again, we are reminded that not all vomiting can be ascribed to gastroesophageal reflux disease. The presence of "red flag" issues in this patient suggests complicated and secondary reflux. A thorough history and physical examination remain the cornerstones in the evaluation of the vomiting child. In more complex cases, presenting with several symptoms, algorithms for the step-wise evaluation of the child with vomiting and poor weight gain are useful in reaching an accurate diagnosis. The algorithms in this newletter may help in preliminary diagnosis. For more detailed information and guidelines please visit **www.CDHNF.org**




## CASE STUDY 3

### Apparent Life Threatening Episodes (ALTE)

A 10-week-old former premature infant is brought to the emergency room by ambulance. The parents state that the infant began coughing, choking and suddenly stopped breathing during feeding. The mother began performing CPR and called 911. When the ambulance arrived the child was breathing spontaneously and was not cyanotic. Parents report the episode appeared to have lasted less than 1 minute. The infant was noted to turn red with perioral cyanosis. Previous medical history reveals an infant who has had frequent choking episodes during feedings. In the emergency room, the infant appears well and the examination is entirely normal.

### Medical History

Important points (Red Flags) to obtain on history:

1. How long did the event last?
2. Did the infant stop breathing?
3. If the infant stopped breathing, did the infant continue making respiratory efforts?
4. Was the infant's heart beating?
5. Was stimulation required to resolve the ALTE?
6. Was there a color change noted (either cyanosis or pallor)?
7. Did the infant choke, gag or vomit with the event?
8. Were there any abnormal movements (stiff or limp extremities) associated with the event?
9. Was there any evidence of recent fevers or illness?